PERFORMANCE CONTRACT

PARTIES: Johnson Controls, Inc. (JCI)
8245 Bayberry Road
Jacksonville, Florida 32256

District Court of Appeal, First District, State of Florida (Customer)
301 South Martin Luther King Boulevard
Tallahassee, Florida 32399-1850

AGREEMENT DOCUMENTS: In addition to the terms and conditions of this Performance Contract, incorporated into this Agreement are the following (check as applicable).

- X Schedule 1--Scope of Work Schedule
- X Schedule 2--Assured Performance Guarantee Schedule
- X Schedule 3-- Services Schedule
- Schedule 4
  - ☐ Schedule 4A--Cash Payment Schedule OR
  - X Schedule 4B--Lease/Purchase Schedule
- X Schedule 5 – Installation Schedule
- X Schedule 6 – Sample Bond
- X Facility Improvement Measure (FIM) Documentation and Savings Calculations
- X Facility Evaluation Report
- X Advertisement
- X Request for Qualifications
- X RFQ Response

1. SCOPE OF THE AGREEMENT. JCI agrees to install various energy conservation measures, facility improvement measures, and operational efficiency improvements (identified in Schedule 1) in compliance with Section 489.145 Florida Statutes, which will result in energy savings or allow the CUSTOMER to avoid future capital or operational costs (identified in Schedule 2). After installation, JCI agrees to provide the services identified in Schedule 3, that are necessary to monitor, measure, and achieve the identified energy savings, subject to the terms of the Assured Performance Guarantee (Schedule 2). The CUSTOMER agrees to take all actions identified in this Agreement that are necessary to achieve the savings identified. As a result, JCI will install the Equipment identified on Schedule 1 of this Agreement (Work) and provide the services detailed on Schedule 3 of this Agreement (Services). JCI shall supervise and direct the Work and shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work and Services under this Agreement. JCI shall be responsible to pay for all labor, materials, equipment, tools, construction equipment and machinery, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. The CUSTOMER's payments to JCI and its interest in the Equipment will be based upon the terms of Schedule 4B and shall be in compliance with Section 215.422 (3)(b), Florida Statutes and Section 287.0582 Florida Statutes. Section 287.0582 Florida Statutes states that performance and obligation to pay under this contract is contingent upon an annual appropriation by The Legislature.

2. **TERM.** The Term of this Agreement shall begin on the Commencement Date, which shall be _____. 2001, or, if no date is included, the date of this Agreement. If the Work is divided into phases or individual projects for which individual prices have been negotiated, then separate Commencement Dates shall apply to each phase or individual project. The Work shall be completed by the Substantial Completion Date, which shall be the earlier of:

   (a) the date on which the CUSTOMER executes a Certificate of Substantial Completion; or

   (b) _____ days after the Commencement Date, subject to adjustments as set forth in Paragraph 3 below.

   If the work is divided into phases or individual projects for which individual prices have been negotiated, then separate Substantial Completion Dates shall apply to each phase or individual project. Substantial Completion means that JCI has provided sufficient materials and services to permit the CUSTOMER to operate the Equipment for its intended purpose or to achieve the intended benefit from the Work. The Services shall commence on the Substantial Complete Date and shall continue for 120 months. The term of the Assured Performance Guarantee (Guarantee Term) shall coincide with the term of the Services. If for any reason, the CUSTOMER cancels or materially breaches this Agreement, including but not limited to the Services Schedule, the Assured Performance Guarantee shall automatically terminate. The Payment Term shall be defined in Schedule 4.

3. **DELAYS.** If JCI is delayed in the commencement or completion of the Work by causes beyond its control and without its fault or negligence, including but not limited to fire, flood, labor disputes, unusual delays in deliveries, abnormal adverse weather conditions, and acts of God, or by failure by the CUSTOMER to perform its obligations under the Performance Contract and Schedules or failure by the CUSTOMER to cooperate with JCI in the timely completion of the Work, then JCI shall provide written notice to the CUSTOMER of the existence, extent of, and reason for such delays. An equitable adjustment in Substantial Completion Date shall be made as a result.

4. **CERTIFICATE OF SUBSTANTIAL COMPLETION.** The Certificate of Substantial Completion to be executed by the CUSTOMER shall include:

   a. an acknowledgement by the CUSTOMER of the buildings substantially completed and the Substantial Completion Date for each building.

   b. an acknowledgment by the CUSTOMER of receipt of manuals and training provided by JCI under the Agreement.

   c. an acknowledgement by the CUSTOMER of the warranty start date and warranty period.

   d. a punchlist of items remaining to be completed by JCI.

   e. an acknowledgement by the CUSTOMER that:

      (i) changes of fire or alarm control points may significantly alter a life safety system, and contribute to a dangerous or life-threatening situation.

      (ii) changes to fire or alarm points may also require approval of local fire authority; changes to other control points may be linked to the life safety system and affect it; and after each such change, the life safety system should be exercised to see that its integrity has not been violated and it functions properly, as was intended.

      (iii) JCI does not warrant against system malfunction caused by improper use, misuse or wrong entry of data by the CUSTOMER, and JCI shall not be liable for situations or damages that are the direct result of user-generated data bases.

Supreme Court of Florida RFQ

Performance Contracting Request For Qualifications

The Supreme Court of Florida (hereinafter referred to as "Owner") is requesting qualifications from interested performance contractors in order to select the most qualified contractor and enter into a Guaranteed Energy Savings Contract pursuant to Section 489.145 of the Florida Statutes.

The objective of this project is to upgrade the Owner's facilities utilizing a comprehensive performance contracting approach, including but not limited to energy audits, design and installation of energy efficient equipment, maintenance services, monitoring of energy costs, project financing, and a guarantee that total program costs will be 100% covered by program energy and operational savings. Following a thorough review of all written responses, the Owner will rank the respondents and begin negotiating with the top-ranked performance contractor. If negotiations are unsuccessful, the Owner will move to the next-ranked firm and continue down the ranks until a contract is successfully executed. The Owner reserves the right to reject any or all responses.

A mandatory pre-proposal conference will be held at 10 A.M. on May 8, 2001 at the owner's site. Companies who do not send an authorized representative to this pre-proposal conference will have their proposals returned unopened and will not be considered. Final selection will be made in accordance with the policies of the Florida Supreme Court and other statutory provisions. Responses must be received no later than 4:00 P.M. on ~~May 29, 2001~~ June 19, 2001 after which they will no longer be accepted. Late responses will be returned unopened and will not be considered. Responses failing to provide information as requested will be disqualified and receive no further consideration. The Owner reserves the right to waive minor informalities. Responses may be mailed or delivered to the address below:

Mr. Wilson E. Barnes
Marshal
500 South Duval Street
Tallahassee, Florida 32399-1928

Timeline for Contractor Selection	
Advertisement Period	04/02/01 – 05/04/01
Pre-Proposal Conference	05/08/01
RFQ Responses Due	06/19/01
Contractor Selection	06/26/01

Att: Colon

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PROJECT FACT SHEET

PERFORMANCE CONTRACTING/ENERGY MANAGEMENT
STATE BR 261
UTILITIES & HVAC SYSTEMS SECTION

PROJECT DESCRIPTION

The Florida State University, (FSU), for and on behalf of the Florida Board of Regents ("Owner"), is interested in contracting with an Energy Service Company (ESCO), for a full range of energy related capital improvements financed through savings from an energy cost reduction program. These services may include but are not limited to a detailed walk-through energy audit, the design, purchase, installation, modification, and training in preventative maintenance and operation of existing and new equipment which will reduce energy consumption associated with the heating, ventilation, and air conditioning systems, the lighting system, the building envelope, the domestic hot water system, and other energy using devices; as well as for services which would not reduce consumption per se but are aimed at cost savings, such as fuel switching or rate changes.

Florida State University is presently seeking an ESCO to help the University substantially reduce its energy consumption. This firm must have proven experience in Mechanical/Electrical Retrofit Projects, Energy Management, and Shared Savings Programs.

It is expected that the ESCO will pay all "up front" costs in the three to seven million dollar range', these costs are to be recovered thru mutually agreed regular payments based on proven energy cost savings. Project design and construction are to comply with established Owner standards and procedures as detailed in the State University System (SUS) Professional Service Guide. ESCO will be required to provide certain guaranteed energy savings. Performance Bonds & Labor and Material Payment Bonds will be required. Appropriate metering and submetering, mutually agreed upon, are to be provided to assure actual energy savings achieved may be accurately documented and proven. The Owner has engaged a Florida Registered Professional firm to serve on the Owner's team. The ESCO will be expected to fully cooperate with the Owner's team, including the Engineering firm.

SELECTION CRITERIA

Esco's will be evaluated in the following areas: current workload, location, past performance, MBE participation, volume of state work, and experience and ability. Comparison of the firms related experience for each one of the selection criteria should be clearly addressed in the submittal package. Experience and ability scores will be based on the following criteria:

I. Firm's experience with shared savings contracts with contract value or not less than one million dollars (1,000,000); where firm provided design. purchase, financing, installation and construction services with payments based on proven energy savings and /or dollar savings. Points (9)

II Firm's experience with energy audits of existing multiple building sites with not less than 10 buildings: audit to include walk-through survey, technical and financial calculations leading to stated payback period (simple payback or present worth method), and prioritized recommendations. Audit to include all energy consuming systems in the buildings (lighting, HVAC etc.) Points (2)

III Firm's experience with energy audits of central (or off-site) utilities serving multiple building sites with not less than 10 buildings; audit to include walk-through survey, technical and financial calculations leading to stated payback period (simple payback or present worth method), and prioritized recommendation. Audit to include central energy consuming systems such as chilled water systems such as chilled water systems, heating systems, etc. Points (2)

IV. Firm's experience with Public Agency or University facilities audit or energy savings equipment/ systems design and construction. Points (3)

V. Experience and background of the members of the project team to identify, design, and construct the project that will significantly reduce energy consumption. The project team should be described in detail and individuals listed who will be involved in the project. Points (3)

VI. Does your firm provide an Energy Savings Performance guarantee? If so please provide explanation of performance contracting approach, including cost sharing formula and performance guarantees. Points (1)

SELECTION SCHEDULE

The anticipated schedule for selection, award, and negotiation is as follows:

Shortlist Meeting: TBA
Final Interview: TBA
Selection Recommendation Approval: TBA
Technical Audit Contract Negotiations: TBA

GENERAL INFORMATION

1. All applicants will be notified of the results of the shortlisting in writing. Finalists will be informed of the interview date and time and will be provided with additional project information, if available.

2. The Selection Committee will make a recommendation to the Chancellor of the State University System All finalists will be notified in writing of the Chancellor's action. Upon approval by the Chancellor, negotiations will be conducted in accordance with Rule 6C-14.0055.

3. Professional liability insurance is required for this project in the amount of $1,000,000.00.

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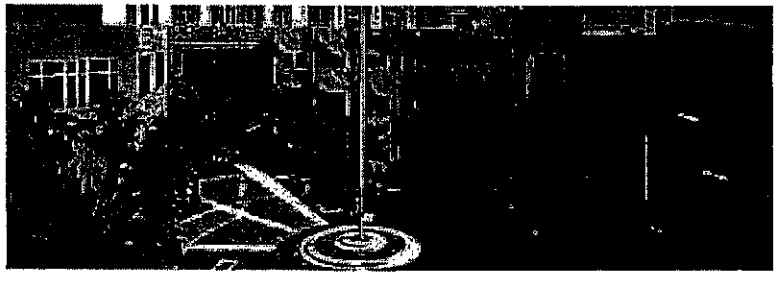
Case Study



Public-Private Partnership Saves Taxpayer Dollars, Energy

Broward County Judicial Complex, Fort Lauderdale, FL

The Broward County Judicial Complex (BCJC) consists of a main courthouse and a north and east wing totaling 800,000 square feet. The Judicial Complex is occupied by more than 1,500 employees.

Challenges:

- Identify potential energy-saving opportunities as mandated by participation in the Environmental Protection Agency Green Lights Program.
- Facilitate a more comfortable and productive personal environment for building inhabitants.
- Identify a creative method of financing improvements to a facility supported by taxpayer dollars.

Solutions:

- Design a $3 million performance contract with Johnson Controls to audit and update the BCJC for increased energy efficiency and environmental comfort.
- Complete a lighting retrofit and install additional equipment, including new chillers, heat pipes, a 1,750 kilowatt generator and energy-saving motors.
- Update the original JC/85/40 Energy Management System to incorporate current Metasys® Facility Management System (FMS) capabilities.
- Contract Johnson Controls to service all new equipment, train employees and monitor energy savings.

Results:

- Exceeded projected annual utility savings of $410,000 by reducing monthly utility expenditures in the main courthouse by 33 percent.

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- Decreased energy use by 755,000 kilowatt hours annually and received a $130,000 rebate from Florida Power & Light.

Lasting Relationship Becomes True Partnership

When the Broward County Judicial Complex committed to the Environmental Protection Agency's Green Light energy conservation program, it was natural the facility would turn to Johnson Controls for assistance. The JC/85/40 building management system, fire alarm system, closed circuit TV, card access and a holding cell locking system were all installed by Johnson Controls. By initiating the $3 million contract with Johnson Controls, BCJC paid for the entire project with savings generated by decreased energy consumption.

"We wanted to see savings in our utility bills," says James L. Flood, director of Broward County's office of general services. "But we didn't want the emphasis only on energy. When we performed the lighting retrofit, Johnson Controls recommended lighting options that saved energy and provided a comfortably lit environment for task performance. We also combined energy conservation measures with indoor air quality studies to make improvements in the workplace."

Additional projects included the installation of new chillers, energy saving motors on appropriate equipment and a new 1,750 kilowatt generator. In the largest installation of its kind in the United States, heat pipes were added to the air conditioning system to reduce humidity.

Updates to the existing JC/85/40 building management system bring the equipment up to current Metasys Facility Management System capabilities. Metasys addresses security concerns, effectively monitoring and networking fire alarm, closed circuit TV, card access, the holding cell locking system, and elevator capture.

The Benefits of a Performance Contract

"We feel that this contract has allowed us to be more responsible custodians of taxpayer resources," says Flood. "The new equipment is saving us thousands over previous utility expenditures. For example, our 1996 utility budget decreased by $1 million, and our 1997 utility budget shows a $580,000 decrease."

The project has reaped several benefits, including a reduction of 755,000 kilowatt hours per year. To date, savings have exceeded the projected of $410,000 annually, partly because of a 33 percent decrease in monthly utility bills. Florida Power & Light also awarded the facility a $130,000 rebate as a result of the lighting retrofit and energy saving equipment installations.

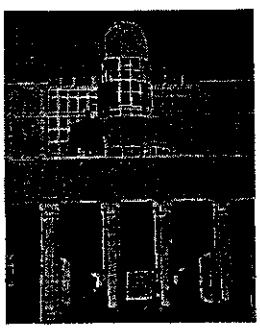
County administrators and elected officials hold up the Judicial Complex program as a jewel in the crown of government fiscal spending. The Judicial Complex is equally complimentary of Johnson Controls.

"Since 1960, with the original installations, Johnson Controls has been outstanding," says Flood. "With preventive maintenance and the training Johnson Controls has provided, things have been handled before they become major problems. To me, that is an indicator of great service."

Case Study


Florida International University


Florida State University


University of Florida


Florida Gulf Coast University

State University System of Florida Clamps Down on Energy Costs

State University System of Florida

Florida's 10 state universities have been opening their doors to increasing numbers of high school graduates, as the Sunshine State's school age population rose 39% from 1986-96. The campuses face even greater demands because Florida's K-12 enrollment is expected to grow another 45% between 1996-2000.

Challenges:

- Enrollment growth has forced Florida's universities to extend classroom hours, which increases utility costs and accelerates the aging of mechanical equipment that keeps occupants comfortable.
- Funding for higher education--as a percentage of the state's general revenue budget--has been declining as other issues related to population growth also demand resources.
- New research centers and other high-tech buildings are requiring vast amounts of energy.

Solutions:

- Four universities have partnered with Johnson Controls to significantly reduce energy

consumption.

- Florida International University, Florida State University and the University of Florida have entered into Performance Contracting agreements that allow major building improvements to be funded by the energy and operational savings which the projects create.
- Florida Gulf Coast University, which opened in 1997, standardized on the Johnson Controls Metasys® Facility Management System to get a firm grip on energy usage from Day One.

Results:

- Florida International University now has the lowest energy consumption per square foot among the 10 state universities (0.749 therms). It had only been the fourth lowest (1.46 therms) before the Performance Contract was initiated in 1994.
- Projected savings of more than $8.5 million from energy conservation measures at Florida State University will provide breathing room for the university's budget.
- The University of Florida expects to save $4 million by tackling one-fifth of the buildings on the campus in a Phase One Performance Contract.

Florida International University

Miami's only public university is surrounded by the nation's fourth and fifth largest K-12 school districts. Together, Dade County and Broward County have added 200,000 students within the last decade. Florida International University (FIU) has grown along with the influx of local high school graduates. But even though five buildings were added in recent years, FIU has had to stretch classroom hours to accommodate its enrollment boom. The typical school day is now 6:00 a.m. to midnight, compared to 8:00 a.m. to 9:30 p.m. just a few years ago.

Nicholas DiCiacco, Executive Director of Business and Finance, Florida International University

"We're running our buildings harder than we ever anticipated," says Nicholas DiCiacco, Executive Director of Business and Finance for FIU's North Campus. "With Miami's year-round heat, it's important that the air conditioning systems in every one of our buildings work properly and are reliable." DiCiacco also says that sufficient ventilation is necessary so that humidity does not have a chance to promote serious indoor air quality problems such as mold and algae growth.

Like most public universities, FIU was faced with a shortage of funds to make costly, but essential, building improvements to prevent equipment downtime. Through a Request for Proposal, FIU selected Johnson Controls to accomplish the work and secure third-party financing. Phase One has brought numerous improvements to the North and South Campuses, including lighting retrofits and air conditioning system replacements. Phase Two involved upgrading the North Campus chiller plant.

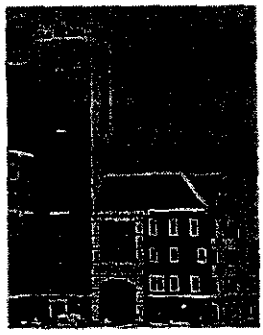
The improvements are expected to deliver $6.1 million in energy and operational savings over a 10-year period, which will pay for the work, financing costs and service. The university gets the benefit of any savings beyond the term of the Performance Contract.

"We have enhanced the quality of the campus environment for students, faculty and our administrative staff," says DiCiacco. "And because things are running better than ever before, we get very few temperature complaints. This has freed our people to devote more time to preventive maintenance programs, which gives us better control over our operations budget."

Florida State University

State university officials at various levels routinely meet with their peers to share ideas and best practices. Florida State University (FSU) in Tallahassee, therefore, sought the advice of Florida International University when it became interested in Performance Contracting. Alan Peck, Associate Director-Facilities Operations & Maintenance, visited FIU a few times during the Request For Proposal selection process.

"When we looked at our finalists, Johnson Controls had far more experience in Performance Contracting, particularly in this part of the country," recalls Peck.



Florida State University is improving energy efficiency in 50 buildings.

"When we looked at our facilities, Johnson Controls had far more experience in Performance Contracting, particularly in this part of the country."
-- Alan Peck, Associate Director, Facilities Operations and Maintenance, Florida State University.

"Their involvement at FIU was a major factor in our decision. the project seemed to be going smoothly down there, and the project management people spoke very highly of Johnson Controls."

The Performance Contract features substantial lighting upgrades, heat recovery devices on air handlers, variable speed drives, and other conservation measures in the top 50 energy-consuming buildings. These measures will yield more than $8.5 million in savings over 10 years. These savings not only will pay for the facility improvements and financing costs, but they are expected to generate additional funds that can be used by the university.

In the years ahead, FSU hopes to devote more resources to replacing aging mechanical equipment throughout the campus. A number of buildings dating from the 1950s and 1960s, for example, still have original temperature and air flow systems that are long past their rated life.

University of Florida

The state's largest and most diverse university, located in Gainesville, has partnered with Johnson Controls for half a century in developing both product and service solutions. This epitomizes the types of relationships with private business that appeal to the University of Florida. To give another example, the university has issued very detailed construction standards that specify only a handful of top-quality suppliers in product categories as diverse as light bulbs, chillers and office furniture. These firms also must be able to deliver fast, full-service support when called upon to do so.

Ed Poppell, Associate Vice President for Administrative Affairs, University of Florida

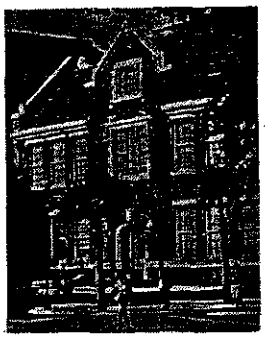
"We want to align ourselves with companies that are going to be around for a long t says Ed Poppell, Associate Vice President for Administrative Affairs.

This level of foresight has extended to consistent energy efficiency measures over t years. The University of Florida added a co-generation plant in 1995 that saves wel $1 million annually in electricity costs. A central chilled water loop constructed in t mid-1990s--featuring control systems by Johnson Controls--delivers operational efficiencies and protects the entire university from a major chiller failure.

Our infrastructure is in fairly good shape because the leadership has recognized the importance of facility improvements for some time," says David O'Brien, Physical Director, However, enrollment has increased from 35,000 students in 1989 to 42,00 1997--with plans to reach 45,000 in the near future. The student influx places stress major building systems.

The Performance Contract with Johnson Controls allows the University of Florida to take a giant step forward in its efforts to stay ahead of the game. In the first phase, lighting and mechanical system retrofits are being performed in 34 buildings--or roughly 20% of the campus square footage. The university expects to save $4 million in energy costs as a result of these improvements. They also will provide an extra measure of assurance that critical equipment will perform reliably.

"We must keep our buildings comfortable and secure if we hope to maintain our longstanding reputation for academic excellence," says Poppell. "Johnson Controls gives us that peace of mind."



Left, Rising enrollment at the University of Florida places greater stress on comfort delivery systems. Right, The University of Florida and Johnson Controls have been business partners for more than 50 years.

Florida Gulf Coast University

Just south of Fort Myers lies Florida's newest university. The eyes of educators around the world are on Florida Gulf Coast University and its innovative approach to delivering cost-effective education.

For example, professors are signed to long-term contracts because tenure is not in the plans. There is no central administration building; the president's office is in the library. Through strategies such as these, Florida Gulf Coast University believes it can educate students with 25% less space than a typical university with the same enrollment.

In keeping with the overall philosophy of doing more with less, the Physical Plant Department has chosen high-quality, sophisticated systems to operate its buildings. One of these is the Johnson Controls Metasys® Facility Management System, which provides automated comfort controls to all buildings. The control system also monitors the chiller plant--and this type of integration may be extended to other systems such as fire, security, elevators and power management.

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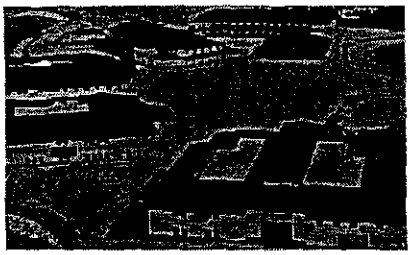

Left, Aerial view of brand new Florida Gulf Coast University. Right, Ice storage will help cool down FGCU's utility bills.

"Eventually, we want the ability to manage our total facilities from a single computer screen," says C.R. Lyons, Physical Plant Director. "This would enhance productivity because we wouldn't have to train people in different software program interfaces."

A major reason why the university selected Johnson Controls as its building automation partner is because of the company's significant presence in Florida. "In my business," says Lyons, "I need to feel very comfortable with the people who are going to service the campus--whether it's controls or pumps or cutting the grass. I'm interested in a long-term commitment and the ability to solve problems quickly. We get that from Johnson Controls."

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Start Saving Energy

For true success, energy management can be accomplished most effectively with a two-sided approach: combining technology and user innovation. Throughout the following pages, *Buildings* offers solutions to some of your energy dilemmas. Presented by building type, but with general guidelines that cross over the broad array of facilities that we cover, there's certainly something here that will pique your interest and impact your bottom line.

Operation: Energy Management

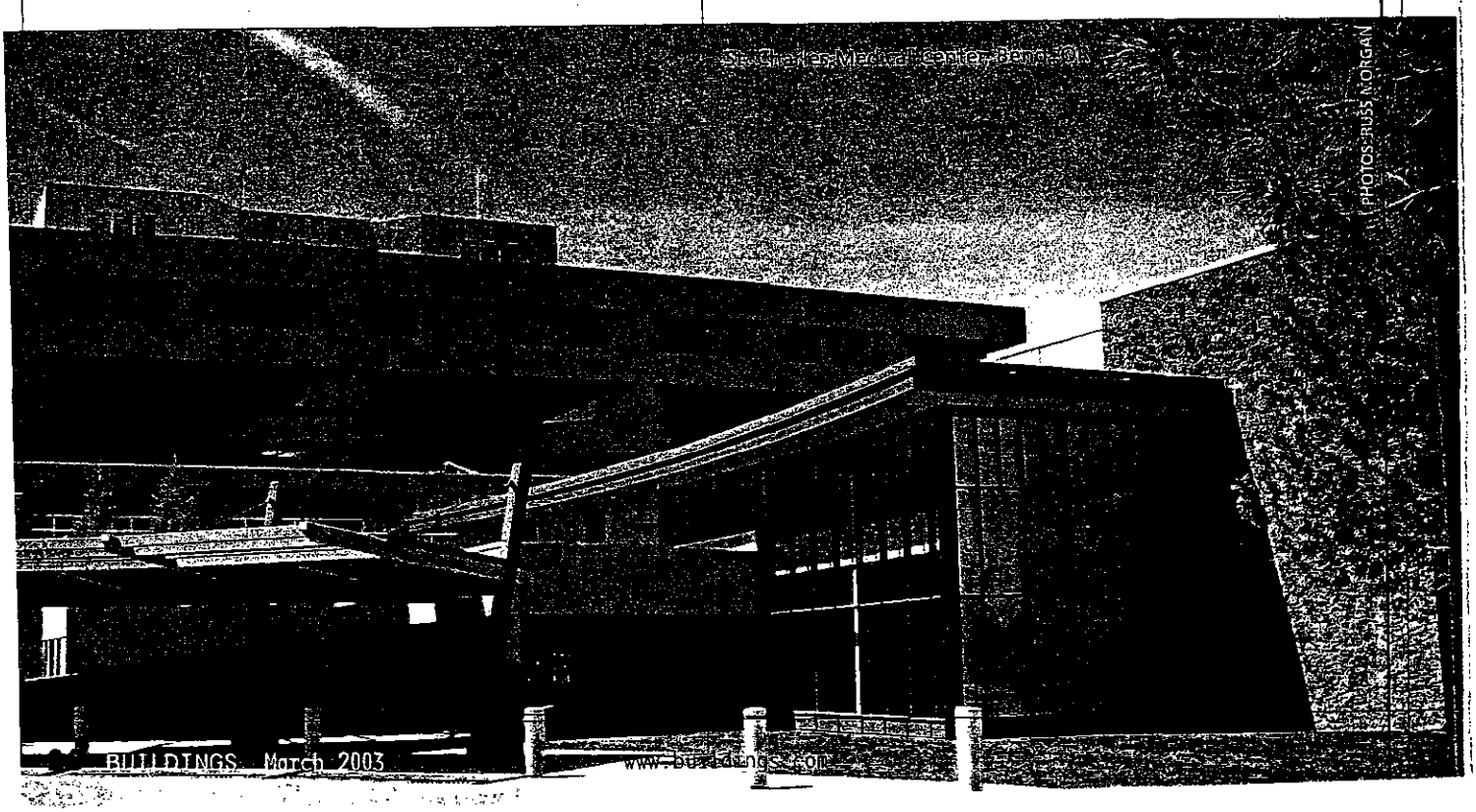
How today's healthcare facilities are dealing with energy-efficiency issues

By Leah B. Garris

It's a 24/7 operation – literally. With surgical procedures, examinations, and medical testing being done every day, buildings devoted to healthcare are constantly in use.

According to the U.S. Environmental Protection Agency's voluntary program, ENERGYSTAR, all-electric healthcare facilities around the country have an energy intensity* nearly twice that of the average building. If statistics are any indication, energy management in this type of setting is unlike energy management in any other application.

Taking into account the needs of patients is top priority. "We



St. Charles Medical Center, Bend, OR, part of Cascade Health Services

can't just minimize the use of energy or ask folks to put on a sweater. Our environment needs to be warm, comfortable, and friendly in the same manner as someone's home. Our primary goal in this business is to provide excellent patient care," explains Merrie Winston, assistant vice president of facilities, Virtua Health, Marlton, NJ.

Jerry Gardner, director, facility/technology services at Cascade Health Services in Bend, OR, agrees, explaining that his facilities' main goal is also to increase patient and staff satisfaction.

"Hospitals are very different than any other application," explains Gary Hirsch, vice president, Global Energy Partners, Olympia, WA. "In regards to energy efficiency, people say that their 'core business' comes first. Very few hospitals can afford to put [energy management] ahead of their core business."

Big or small, healthcare facilities share similar thoughts when planning energy management strategies: Patient comfort and care must come first. Healthcare facilities are often faced with issues that other buildings don't need to worry about. Hirsch provides air circulation as an example. Since hospitals don't recirculate air in areas where infection is likely to be an issue, all indoor air goes out and must be filtered, while all outdoor air comes in and must be either heated or cooled. Therefore, hospitals use a great deal of energy just for heating and cooling.

But, there are things healthcare facilities can do to manage their energy consumption without sacrificing patient care. Switching out old lighting systems and lamps for more energy-efficient systems, applying solar film to windows, replacing motors and air-handling units, and implementing building automation systems are techniques that hospitals cite again and again when discussing their approaches to energy management.

"We have 24/7 coverage through that building automation system. We can not only tweak utilities for better management, but we can also look for failure or things that aren't working correctly. If [something] is starting to not work properly, it will show up," notes Gardner. "We're trying to work smarter, not harder."

In some cases, outside professionals can help facilities learn to manage and control their energy costs. "We've contracted with Johnson Controls for a building environmental specialist," says Gardner. "[They tweak] our building automation systems when [they are] here. In the first year we did that, we saved an additional $120,000."

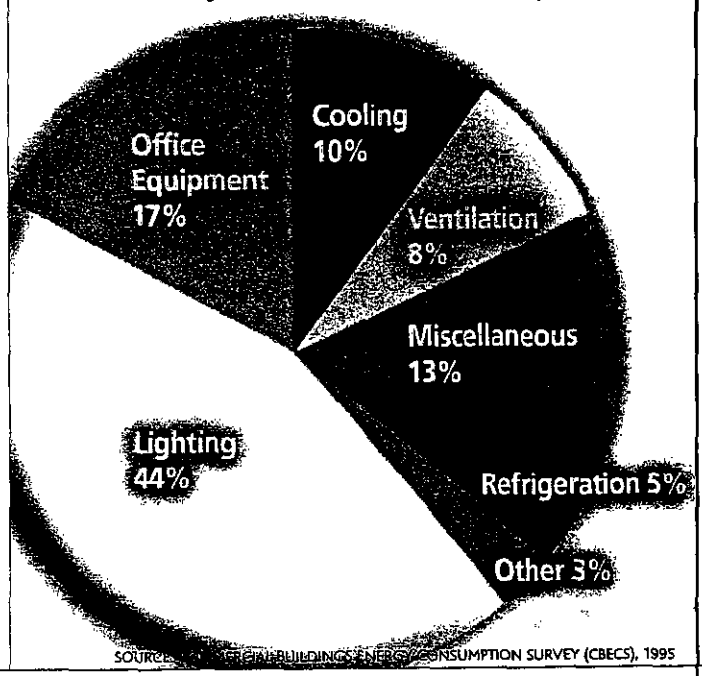
Both Virtua Health and Cascade Health Services have experienced success with their energy management techniques and have paved the way for other healthcare facilities to follow in their footsteps.

Bend, OR-based St. Charles Medical Center, part of Cascade Health Services, was the first hospital in the nation recognized by ENERGYSTAR for its energy saving upgrades. A voluntary program that promotes energy performance as a way for healthcare facilities to improve financial performance while protecting the environment, ENERGYSTAR now offers a benchmarking system to let hospitals know where they fall in terms of their energy management strategies.

"We knew that EPA had started its ENERGYSTAR program, and we wanted to be the first hospital. We made it. We were the first hospital in the nation to be recognized. At that time, we were thrown in with everybody else. Now, [the EPA has] made a separate

continued

Site Electricity Use in Healthcare Buildings



SOURCE: COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY (CBECS), 1995

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category just for hospitals," notes Gardner. This recognition came after St. Charles had paired with Portland, OR-based Bonneville Power Administration and Milwaukee, WI-based Johnson Controls. They worked together to create a performance contract, allowing St. Charles to pursue its goal of saving $121,000 per year with a payback of seven years.

"We actually paid it off in five years, and that's even with adding additional square footage during that period of time," Gardner explains. "We're pretty proactive [about] cost control, and so we try to get all departments participating and operating at the best they can."

Chuck Haynes, manager, facility services, St. Charles Medical Center, describes his company's energy management strategies as "results-oriented. When we look at our maintenance strategies, we leverage our technologies that will help identify risk (potential equipment failure, energy spikes). We combine this type of proactive risk reduction strategy with [our] other solutions and that really helps the facilities department be a vital part of our mission statement."

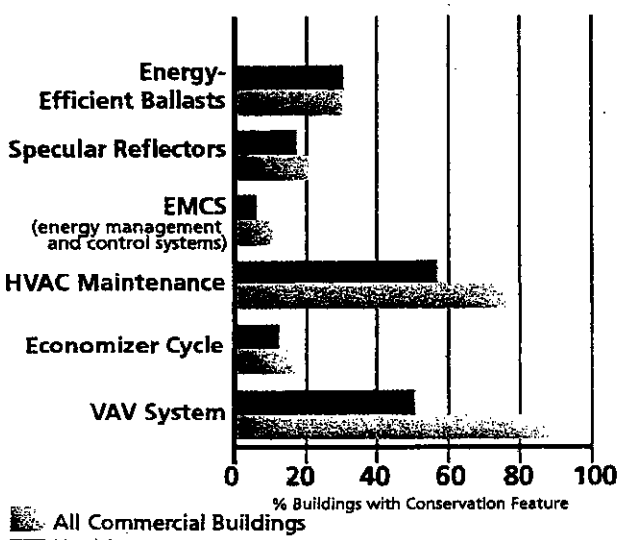
Virtua Health, the largest provider of healthcare in southern New Jersey, has pursued energy-efficient upgrades since 1993. An ENERGYSTAR award winner in 2001, Virtua has experienced a 21-percent reduction in annual energy costs due to the implementation of energy management strategies. Teaming with Horsham, PA-based GHR Consulting, Virtua management looked at creative funding opportunities with utility companies and developed a strategy. "We determined an annual energy savings that we could calculate. The strategy was based on combining an institutional conservation program with the demand of site-management programs with electric utility companies," explains Winston. Virtua has also explained strategies to their lease sites, challenging the landlords they rent from to use the same type of energy management and showing them how they can cut expenses while protecting nature.

In addition to saving money and the environment, there's another reason energy management is beneficial to healthcare facilities. Dollars saved in energy costs can be redistributed throughout the hospital, providing extra funds for research and for the facility in general. "What we needed to do first of all was convince the top management that we could do it ... that we would be able to guarantee there would be savings coming out of this. I think you have to have top management buy in," says Gardner.

Offering advice to those just beginning an evaluation of energy-efficient possibilities, Haynes emphasizes to "take advantage of the resources that are out there. Associations like ASHE (American Society of Healthcare Engineers) are filled with professionals that all have the same opportunities and goals, and there's a way to network with those associations to pick up particular advice from other hospitals."

* Energy consumption/unit of measurement (square foot, number of employees, etc.)

Conservation Efforts



SOURCE: CBECS, 1995

Raising Their Energy Grades

In an era of school funding concerns, educational facilities look to reduce energy costs

By Robin Suttell

Officials and administrators in both K-12 and higher education are looking for ways to run leaner. At the same time, they're also looking to reduce energy costs – a significant budget sieve for most schools and universities nationwide.

The U.S. Department of Energy (DOE) estimates America's schools spend more than $6 billion each year on energy. DOE analysts believe these institutions could save at least 25 percent of that, roughly $1.5 billion on a national basis, through better building design, new efficient and renewable technologies, and improvements in maintenance and operations practices.

The need to reduce energy costs and increase savings in educational facilities budgets isn't limited to a specific region. It's a nationwide concern that has schools seeking answers and community support.

In Iowa, schools, local governments, and healthcare facilities are in need of $500 million in cost-effective energy management improvements. In 1990, the state developed a program, the Iowa Energy Bank, that allows these facilities to identify and implement cost-effective energy management improvements with no upfront costs.

According to Monica Stone, executive officer of the Iowa Department of Natural Resources' (DNR) Energy Bureau, the program takes advantage of the state's experience in implementing energy management programming and the "unlimited capital

The need to reduce energy costs and increase savings in educational facilities budgets isn't limited to a specific region. It's a nationwide concern that has schools seeking answers and community support.

available from the region's investment bankers" to allow public and non-profit facilities to save on energy costs.

To date, 220 school districts, representing 1,200 buildings, have participated or are participating in the program. Each year, about 15 to 20 school districts will use the program, Stone says.

Each enrolled school district, college, or university receives an energy analysis appropriate for its facilities. Upon completion, the participating school submits its study to the DNR for review. Once a study is accepted, the client may take advantage of the DNR's arranged financing to pay for the improvements. A team of financial consultants works with the school to identify the best arrangement, either accessing in-house capital or financing the improvements through a regional investment bank. Clients can arrange for the financing to be budget-neutral, allowing the entire cost of the program to be paid for from the energy savings.

"All projects that will pay for themselves within their useful life are eligible for this program," Stone says. "For existing facilities, we generally address lighting, HVAC, operation and maintenance measures, and water efficiency measures."

The Energy Bank can also fund renewable energy systems and has funded more than 10 wind turbines for schools, Stone notes. The program also helps schools install energy-efficient equipment in new facilities.

To date, the Iowa Energy Bank and other Building Energy Management Programs in Iowa have been responsible for $170 million in improvements with $100 million of that savings in the educational segment. Savings in this segment have been about $17 million, Stone says.

"The single largest dollar retrofit project we've done to date in a school district has been with the Oelwein School District for $920,000," she says. "This project included a lighting retrofit, insulation, controls, an energy management system, water conservation measures, and a geoexchange system. However, for several schools, we've done many projects over the years that have added up to larger dollars implemented. With the number of small school districts in the state, the individual projects are not large, but we make up for it in the volume of projects that we do."

While the state of Maryland does not have a program similar to the Iowa Energy Bank, the drive to save energy dollars, the state's largest district and the 18th largest in the nation has been following a strict energy management program since 1978.

Montgomery County Public Schools (MCPS) in Rockville, MD, has 138,891 students and an operating budget of $1.4 billion for fiscal year 2003. Since 1978, MCPS' energy efficiency has improved by 35 percent, resulting in more than a $4 million-per-year cost avoidance in the district's 191 buildings and 300,442 square feet of new and modernized space.

"All facilities processes and products are reviewed periodically and improved by process action teams involving all stakeholders," explains Ron Balon, the district's energy manager. "Advances in building and information technology constantly open new opportunities for improvement. Currently, a Mechanical Systems process action team, consisting of energy, maintenance, and construction personnel, is re-evaluating our department's processes and products in creating HVAC systems, from selection and design to construction and commissioning."

continued

Sometimes, It's the Little Things ...

- Develop and maintain an energy accounting system.
- Stagger major equipment start times.
- Reduce parking lot lighting to as low as 25 percent after hours, where appropriate.
- Use ink jet printers rather than laser printers when printing draft copies.
- Bill for energy used during commercial-sponsored events.
- Turn off lights and power on "optional" equipment/spaces after hours (vending machines, trash compactors, display cases, personal computers, coffee makers, etc.).
- Calibrate temperature sensors annually.
- Review preventive maintenance program to improve HVAC and other major system efficiencies and performance.
- Report energy-related problems to the appropriate personnel.
- Synchronize exhaust system start times to opening times.
- Ensure that all thermostats are calibrated and installed level.
- Develop a protocol for maintenance and operations team to perform periodic self-audits for each building.

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Balon says the program initially focused on retrofit of energy management systems until 1990. The focus then switched to lighting retrofits of new technology lamps and ballasts, including electronic ballasts, T8 lamps, LED exits, and compact fluorescent downlights, among others.

MCPS is undertaking a massive initiative toward adding energy-efficient features in modernization and new construction projects, too, Balon notes. The district has made standard the use of high-efficiency lighting (1.0 watts/Ft^2), ventilation air energy recovery, direct digital control of HVAC functions, high-performance windows, and modern condensing boilers.

To date, 85 percent (170) of buildings have received lighting retrofits and energy management control systems, while five percent of the facilities (10 buildings) meet advanced construction standards for thermal envelope and HVAC systems types, as well as lighting and energy management.

Balon says MCPS is moving toward LEED silver certification of new buildings. A geothermal heat-pump system – no boilers, chillers, or cooling towers – is installed at one new elementary school and is in the works for the district's next new high school.

The program has expanded beyond physical facilities. In 1993, the district added behavioral award programs through its School Eco-Response Team (SERT).

The district's SERT program sets up teams and activities centered on energy awareness and conservation in the schools and the community. Small grants are made available each year to defray costs. Successful schools – about half in the district participate in any given year – are rewarded with a check of up to $1,000 at the end of the year.

"Almost all schools that participate receive awards and recognition at some level," Balon says. "It's very successful at maintaining energy awareness with staff and students."

No Reservations about Energy Management

Checking out conservation strategies in the hospitality industry

By Jana J. Madsen

Small actions result in big savings when you're talking about energy management in the hospitality industry. The 24/7 nature of hotel and lodging operations can escalate energy usage from sensible to shocking if energy management practices are not developed and implemented. "I'd say that maybe 10 percent of the hotels out there have a good, solid energy management program," says Phil Sprague, president, PSA Energy Consultants, Mound, MN. If Sprague's estimates are correct, simple math shows that nearly 52,000* lodging establishments in America are not reaping the benefits of efficient products, systems, and procedures – actions that can save hoteliers upwards of 20 to 40 percent in operating costs.

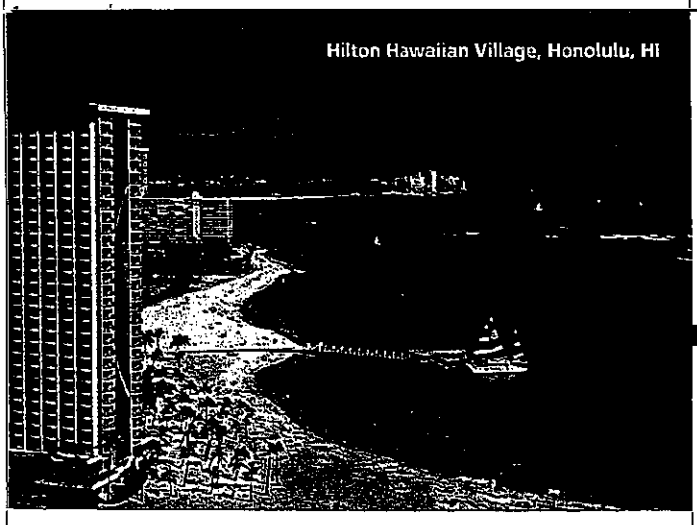
Those in the hospitality industry implementing smart strategies to save energy will be the first to validate the worth of these programs. "It's just a day-to-day thing here. We have a mantra, 'energy management is good business' all the time – period," says John L. Lembo, director of energy, North American Hotel Operations, Starwood Hotels & Resorts Worldwide Inc., White Plains, NY.

No effective energy management plan can begin until a thorough analysis of energy usage has been conducted. A daily record of energy use and hotel activities will help you arrive at this point. According to the Washington, D.C.-based American Hotel & Lodging Association (AH&LA), it is important to record the following each day: a reading of electric, gas, and water meters; occupancy and count of guests; meal covers; weather conditions; laundry usage; and estimated usage and hours of operation for exercise equipment. Analyze the findings by cross-referencing the data with the monthly statement received from utilities.

An analysis can become the springboard for discussion with representatives from your local utilities. "I'll bet you that more than half of the hotels in America are on the wrong utility rate,"

continued

New York Hilton Hotel


Hilton Hawaiian Village, Honolulu, HI

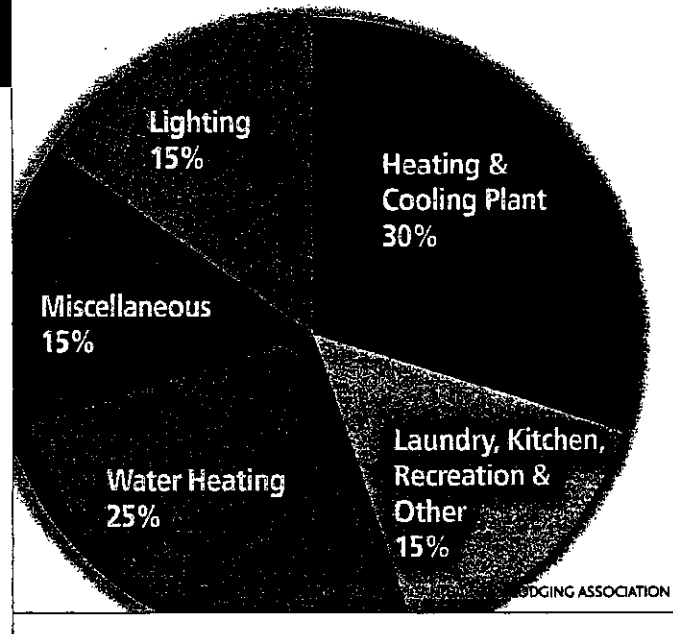
Sprague says. With almost 30 years of experience advising the hospitality industry in ways to reduce energy, Sprague suggests that, when possible, hotels should be on the time-of-day rate because about 65 to 70 percent of energy consumed in hotels is during off-peak periods. "By simply asking your utility to change your rate, you can save three to five percent on energy costs," he adds.

Implementing an effective energy management program might take time and effort but it doesn't have to take a huge budget. "As far as best practices are concerned, there are a thousand things that one can look into to save money that make sense and are generally not realized because they are so simple," explains Edwin Figueroa, director, engineering operations, Hilton Hotels Corp., Beverly Hills. Setting thermostats to cool to 85 degrees F. in unoccupied rooms, renting guestrooms affected by climate (top floor, end of corridors, facing west or facing east) only as necessary, and cleaning or replacing HVAC filters are just a few suggestions from the AH&LA's *Energy Management and Conservation Guide*. "Operations and maintenance is a key factor in any hotel energy conservation program," Sprague adds.

One initiative in the four-part energy management plan implemented by Hilton Hotels Corp. specifically seeks out these types of best practices, posting them on the company Intranet to share. "Believe it or not, our team members were the ones that came up with the greatest majority of these suggestions. And when we implemented them in our first year, we found that just on best practices alone, we were able to reduce as a company (in the managed and owned brand) approximately five percent in savings – just on common sense items," says Figueroa about changes in lighting, guestroom temperature, and food preparation.

If housekeeping services turn on fewer lights while cleaning, savings are imminent. However, if the lights they turn on are incandescent lamps, the potential to increase these savings is vast. "If you replace a 100-watt [incandescent] light with an 18-watt or 23-watt compact fluorescent, you've reduced energy consumption by 50 percent – multiply that by an average of about 10 lights in a guestroom, multiplied by over 1,000 guestrooms, [and] a good retrofit program saves a huge amount of energy," Figueroa explains.

Typical Hotel's Energy Use



Lighting retrofits are just one way that energy consumption is reduced without compromising the quality of the product. "Energy management can and should be invisible to the guest," says Sprague. Other products worthy of investigation and possible investment include: low-flow showerheads, energy-efficient chillers, reflective window film, exit sign retrofit kits, and variable frequency drives on pump motor controllers. Check with your utilities about the availability of rebates to offset the expense of new equipment.

Computerized energy management (EMS) and building automation systems can regulate lighting and HVAC controls, as well as help with load-shedding and equipment cycling. According to the AH&LA's *Guide*, these systems (with proper installation) will result in optimistic savings of 20 to 25 percent.

continued

"As far as best practices are concerned, there are a thousand things that one can look into to save money that make sense and are generally not realized because they are so simple."

— Edwin Figueroa, Director, Engineering Operations, Hilton Hotels Corp., Beverly Hills

Lobby of the Waldorf-Astoria Hilton Hotel, New York City

To combat wasteful guests, guestroom controls that utilize infrared, sound, or ultrasonic occupancy sensors can reduce wasted energy from lighting in unoccupied rooms.

While most energy management strategies can result in a three-year or less payback, investments in alternative energy sources provide a much longer return on investment (sometimes 10 to 15 years). However, funding from utilities and state or local agencies can minimize the costs substantially. "We're putting two fuel cells [in hotels] in the state of New Jersey. We received $1.6 million from the New Jersey Clean Energy Fund for these units. Now we're going to get some additional energy efficiency [and] we're going to be to 'clean and green,'" says Lembo.

Cogeneration, or combined heat and power as it's often called, is another means to reduce peak-load demand rates. "It's a much more efficient way of generating power because you are using waste heat," Lembo explains. As noted by AH&LA, another advantage of cogeneration is the increased reliability of your energy supply.

If the idea of implementing a program seems daunting, remember the following of Sprague's comments: "The real bottom line is there is no logical reason why any hotelier can't implement one of these programs – it's just bad business judgment [if they don't]."

Start with an energy audit. An independent company or consultant can look at your facility's historic energy profile, diagnose effective energy conservation methods, and recommend changes to systems and procedures.

Make sure your consumption and goals are measurable. "Energy accounting is the foundation of any energy program," Sprague advises.

Educate yourself. Contact associations such as the AH&LA, use the Internet, learn how to read your monthly utility statements, and find out about rebate opportunities.

Scrutinize operations. Evaluate all processes from food preparation to laundry services and ask your team to provide suggestions for improvement.

Invest appropriate capital. When building products and systems need upgrading, align capital to deliver energy-efficient alternatives.

Whether you own or manage one hotel or an entire portfolio, the quest for energy management must be ongoing. Says Figueroa, "You can always do better – as long as you stay in pursuit."

* A total universe of 58,162 establishments fall under the NAICS code of 72 "Accommodations," in the 1997 Economic Census.

Power Partners
in Office Energy

Strategic alliance has bottom line results

By Linda K. Monroe

CarrAmerica prides itself "in anticipating the changing needs of a changing marketplace." In so doing, the Washington, D.C.-based real estate investment trust (REIT) has evolved into a premium provider of quality office product in national growth markets. Presently, CarrAmerica owns, develops, and/or operates more than 40 million square feet of office properties in 12 markets throughout the United States. In keeping with its identity as an office innovator, the organization has developed far-reaching strategic relationships to increase its Funds From Operations (FFO), including a significant agreement that is lowering costs associated with procuring and administering energy commodities with Ameresco Inc., Framingham, MA.

According to CarrAmerica Managing Director of Operations, Rich Greninger, "California was nearing deregulation that began to impact us in 2000. Our executive management team determined and challenged Operations to develop an energy strategy that would effectively manage the risk and opportunities in a deregulated marketplace. We sought to find a partner that would be capable of supporting our needs in each of our 12 markets in a multiple of areas. Around that time, we entered into a service agreement relationship with DukeSolutions, Charlotte, NC (later purchased by Ameresco Inc. in March 2002), which covered five areas:

1) Bill Paying, in which Duke handled payment and administration processes between CarrAmerica and its associated utility and energy companies.

2) Information Management, whereby all information for a bill was loaded into a mega-database to allow CarrAmerica staff to review energy profiles and energy usage in each building in real time over the Web, then benchmark markets to help drive changes in engineering behavior.

3) Transitional Services, that ensured rate plan negotiations with regulated entities were favorable to CarrAmerica properties.

continued

"CarrAmerica is able to execute deals with suppliers, and suppliers are able to offer deals knowing that Carr is a serious player in this market."

— Walter Jones, Supply Management Consultant, Ameresco Inc.

4) Supply Management, to secure deregulated energy from suppliers in a way that effectively managed the risk and opportunity for savings.

5) Efficiency Services, which was set up to reduce energy consumption in CarrAmerica's capital projects."

As the relationship matured, so did the agreement. Barry Krell, the vice president of Special Projects at CarrAmerica charged with managing the relationship with Duke/Ameresco, explains, "Of the five original service agreements, we now have three with Ameresco: the information, which was key – the Bill Paying – outsourcing it, getting rid of late payments, and being able to see real time on the Web; Transitional Energy, in which we've done only a few deals; and Supply Management. Here, in the three areas in which we are deregulated [Dallas; Orange County, CA; and the Washington, D.C. area], we've realized material savings in getting the best deals for our buildings."

Center to the alliance's success was an executive-driven mandate from CarrAmerica to develop such a program, notes Bryant Lee, Ameresco. "CarrAmerica decided what it needed to do and what it wanted to do, and [the program] was given the appropriate level of executive support, both through the deal negotiation and then through the implementation," he says.

"Especially in a multi-market company," adds Greninger. "Collaboration can be difficult at times, and when you have a top-down mandate to come up with a strategic national program, it certainly improves the ability to execute."

Walter Jones, supply management consultant, Ameresco, concurs with this assessment, further noting, "Internally, CarrAmerica has set up a management and decision-making infrastructure to analyze deals and, more importantly, to execute deals. By efficiently filtering the information out to the folks at specific buildings, CarrAmerica is able to execute deals with suppliers, and suppliers are able to offer deals knowing that Carr is a serious

player in this market. There's a whole circle of communication that really works in this relationship."

Today, Greninger notes that CarrAmerica's energy strategy and implementation "is all part of a composite of what our brand stands for. We're an aggressive management company looking for ways to improve our tenants' quality of life every single day."

The far-reaching benefit of savings is another factor.

"Based on the bare economics of the first three years of the Carr/Ameresco relationship," explains Greninger, "we've been able to beat the standard tariff. In other words, what 80 to 90 percent of commercial procurers of energy (commercial office landlords) pay, we've been able to beat that by about $4 million – which is being produced predominantly in just three markets.

"As important, is that when you're running a national company with 12 different markets – and we try to run our company more decentralized than centralized – we've achieved greater benefit in having professionals like Ameresco helping us with the negotiation of contracts and agreements to make sure that, first and foremost, we're going to secure reliable energy; and, secondly, we're not accepting too much risk for the benefit of achieving savings." B

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System Savvy

Charged with Operations improvements throughout CarrAmerica's 12 office markets, Rich Greninger and Barry Krell say the company "is blessed with a very mature operations engineering group that has been astute at making physical improvements throughout the CarrAmerica buildings."

Working with local energy utility entities during the early/mid-1990s to upgrade a lot of Carr properties – resulting in efficiency credits and a $4 million pay-out from the local utility PEPCO to improve the infrastructure in its buildings – the CarrAmerica engineering group focused on several major areas, including:

- **Lighting.**
- **Air-conditioning systems/chillers.**
- **Motor system efficiency,** including variable frequency drives.
- **Controls and EMS system upgrades.**

These early and continuing efficiency projects lead the company to look beyond the more typical physical improvements to their buildings for a competitive edge, and the CarrAmerica/Duke-Ameresco relationship was born. As capital projects were analyzed and determined "efficient" during the information-gathering phase, the alliance and service agreements eventually morphed into three distinct areas directly tied to energy procurement and information administration.

MARCH 2003

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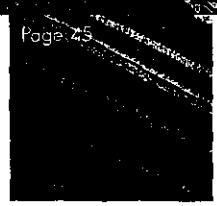
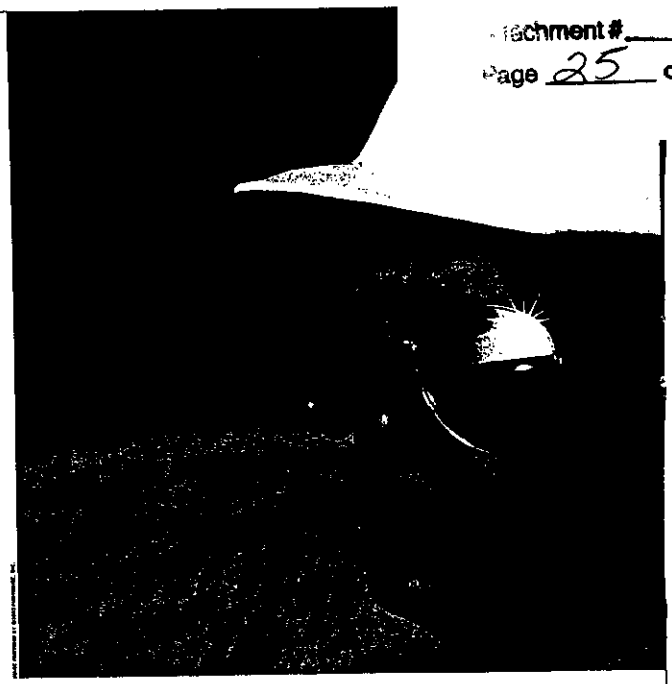
DEPARTMENTS



The Science Of Selecting An ESCO

Finding the right energy service company (ESCO) has a greater relevance in trying economic times.

Darcy Immerman and John Upchurch, Alliant Energy Integrated Services



The first step for facility managers considering energy management outsourcing is to identify the issues their companies face internally. It is important to identify needs and rationale for outsourcing. This includes quantifying energy market activity, facility infrastructure status, budget issues, and the impact of those issues on operations.

Some questions to consider include:

- What is the current energy situation the company is facing?
- What changes have taken place in the energy marketplace and what effect are those changes having on the company?
- What does the facility manager hope to accomplish through outsourcing?

These issues could include, but are should not be limited to:

- Reducing costs;
- Improving facility infrastructure;
- Managing budgets;
- Improving energy reliability;
- Mitigating price risk;
- Downsizing operations;
- Responding to the increasing complexity/inability to keep up with rules and regulations in the electric industry; and
- Outsourcing non-core functions.

This needs assessment carries out different functions. First, it helps to set goals to be accomplished. Potential ESCOs can make more specific and effective proposals once they know what the customer truly wants to accomplish.

Second, the needs assessment helps the facility manager identify the kind of company with which to partner. This assessment helps identify the scope of outsourcing. This can range from outsourcing a single project, to supply-side services, to demand-side projects, to overall corporate energy management.

Once the needs and objectives are identified, the company can begin looking at the attributes of potential ESCOs. Expertise and experience are key factors. That experience should reflect a depth and breadth of activities that indicate the ESCO can handle the specific issues faced by the company.

1. Assess the company's track record and credibility; the degree of due diligence regarding potential ESCOs will be a function of the degree of outsourcing. The more functions that are outsourced, the more detailed the facility manager's investigation should be.

Perhaps the most significant attribute is the ESCO's experience. Experience is more than just a list of past clients. It also should include a demonstration of technical expertise and effective results for clients.

Here are some important criteria to consider in the evaluation process:

- Is the ESCO accredited by the National Association of Energy Service Companies (NAESCO)? This is a good way to assess credibility and competence. NAESCO offers industry accreditation.
- Does the ESCO have experience in executing a master energy services agreement (MESA) at a corporate level while managing individual projects that are site specific? Case studies and project references should help determine this qualification.
- Does the ESCO provide ongoing maintenance and remote, 24/7 monitoring of project performance for multiple sites? Many ESCOs provide this service, but not all do. This is a key component in ensuring the energy project investment is gaining the maximum cost savings and reliability.
- What types of measurement criteria are used to validate energy savings? This is an important question to ask because it sets up the structure the project guarantees are based upon.
- Does the ESCO offer both supply and demand side energy services? ESCOs with expertise and offerings on both sides can develop a more comprehensive and customized energy plan.
- Does the company also offer environmental services and expertise? Energy and environmental issues are closely tied, and expertise in both areas can be an advantage when selecting an ESCO.
- How can the ESCO help implement the project if capital is not available? ESCOs may offer contracts that link financing of the projects to the energy savings generated.

2. Verify experience and performance beyond getting the potential ESCO's assessment; take the time to assess the ESCO's expertise. References should be provided and checked thoroughly.

3. Test for "fit," because the ESCO could potentially be a long-term strategic partner. The facility manager needs to ensure the partner "fits" with his or her company—that includes agreement on operating issues and decision making processes.

Experienced ESCOs understand the complex relationships within organizations and can help the facility manager navigate the challenging internal waters. Perhaps no attribute is more important in gauging "fit" than the ability of the partner to listen.

4. Help formulate how the project's success is measured. The primary condition for success is often energy savings, but other important conditions may include on time completion, improved productivity, operational effectiveness, or enhanced energy efficiency without impacting capital costs.

In this time of energy market volatility and ever changing regulatory issues, teaming with the right ESCO can be a valuable advantage. This involvement brings expertise into the company where it's needed while allowing facility managers to focus on core business issues. □

Immerman is vice president of business development, and Upchurch is vice president of sales at Cedar Rapids, IA-based Alliant Energy Integrated Services. For more information, visit www.alliantenergyisc.com or call (877) 725-6611.

Does your company have a set criteria for hiring ESCOs? Share your stories or anecdotes by e-mailing jparkinson@groupc.com.

From Managing Buildings To Managing Energy

Facility managers continue their search to add value to their facility operations.

Dirk Mahling and Bill O'Connor, WebGen Systems

In many cases, budget cuts have reduced large maintenance staffs to a handful of people. In addition to providing end users with what they need, overburdened, understaffed facility managers have to keep an eye on the energy budget—which is a job unto itself.

Hampered with the mandate to save energy and to keep that budget in check, where should the facility manager turn? Generally there are three options:

1. Introduce new energy savings procedures and operations;
2. Count on retrofits for existing devices that save energy; and
3. Turn to a new breed of energy management systems.

Facility managers often turn to their building automation systems (BAS) or building management systems (BMS) first. Some may have heard about technologies that enable building management systems to be more efficient and responsive. However, can these technologies really make a difference between an energy conscious company and an energy saving company?

There are several categories of systems that make managing and conserving energy easier, but finding one that can advance a company's quest toward energy savings is essential. Traditionally, BMS and BAS have not always had an energy focus. Little of the information or analysis in terms of energy consumption, cost, and spending has been utilized by companies.

One option that allows facility managers to get a handle on that type of information is an energy information system (EIS). An EIS allows facility professionals to analyze their energy usage by aggregating and analyzing historic data from their buildings' electrical meters. This allows users to change settings and schedules manually.

Software To The Rescue

The next level in taking charge of energy savings and the associated expenditures is an enterprise energy management (EEM) system. These systems are often Web-based and allow a central control room to monitor multiple building sites independent of the model and make of the local BMS. This assumes sufficient staff is present to man a central control room—hardly a valid assumption.

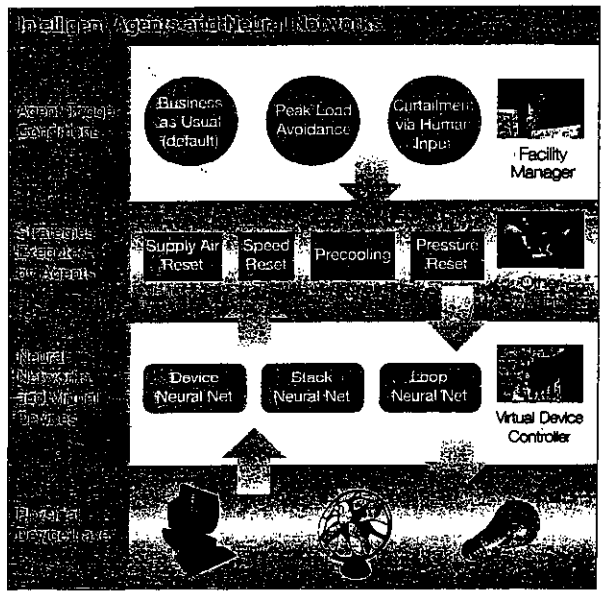
Since EEMs focus on monitoring, demand responsiveness becomes an issue. To cope with the downfall of the EEM approach, a new class of systems was developed. Demand Response Systems (DRSs) allow facility professionals to organize their energy data remotely. They also facilitate curtailment of energy in brownout or blackout situations. DRSs alert the facility manager to an emergency situation, and the user then needs to assess the situation and respond.

To leverage a DRS effectively, manual curtailment plans must be drawn up, and a clear chain of communications must be established. Historically, this large effort lead to a brittle solution which pushed many building owners away from the revenue they could have gained from curtailing based on demand response. Since a manual DRS is not very reliable, the chance of failing to meet a curtailment goal is high.

Proactive Systems

The most advanced systems today go a step beyond demand response and general energy management. With an Internet based automatic demand response system

Through knowledge transfer and intelligent agents, facility professionals can add a reliable and affordable electronic energy manager to their staff and meet their energy saving objectives.



(ADRS), organizations can achieve proactive energy saving status. Such ADRSs usually provide monitoring similar to an EEM and management of manual demand response like a DRS. But then they go further, giving building owners the confidence to participate in DRS and curtailment programs.

Web-based artificial agents track data, allow for optimization, and facilitate demand response. Today's technology allows these agents to manage energy automatically and intelligently.

An ADRS enables an organization to take charge of its energy usage and attain reliable energy savings. The ADRS communicates to electric meters and building management systems over the Internet, and then appropriate control strategies are applied to lower energy usage by optimizing temperature and pressure settings. Technology allows these systems to learn how to respond to various conditions, such as weather, time of day, building occupancy, and energy cost. Energy loads can also be rotated throughout the building so no one section feels a discernable difference in comfort. Yet, energy is saved as motor speeds are controlled and started/stopped using these load rotation strategies.

On The Path To Energy Savings

The following can help keep those pesky energy costs down:

- Understand energy consumption patterns and make adjustments as necessary.
- Upgrade windows, lighting, and insulation for peak performance.
- Install energy efficient motors in HVAC systems and
- Explore alternative cost effective ways to manage energy systems such as proactive or automated systems that work to control and combat consumption drains on the energy used in buildings.

Intelligent automated systems can also take numerous other data points into consideration and execute rotations without a manual adjustment. Facility managers can see the energy savings in the data that is captured and keep track of their energy conservation efforts to demonstrate the organization's commitment to energy savings. □

Mabling is chief technology officer (CTO) and O'Connor is a project manager at Cambridge, MA-based WebGen Systems. They can be reached by e-mail at dmabling@webgensystems.com and boconnor@webgensystems.com.

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